



Mexican Hat, Utah, Disposal Site

FACT SHEET

This fact sheet provides information about the Uranium Mill Tailings Radiation Control Act of 1978 Title I processing site at Mexican Hat, Utah. This site is managed by the U.S. Department of Energy Office of Legacy Management.

Site Location and History

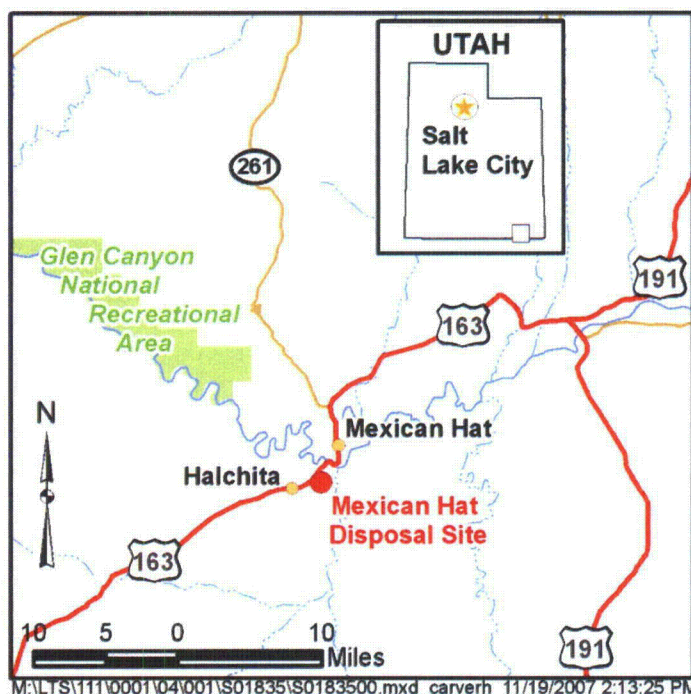
The Mexican Hat disposal site is located on the Navajo Reservation in southeast Utah, 1.5 miles southwest of the town of Mexican Hat and about 10 miles north of the Utah-Arizona border. The site is also the location of a former uranium-ore-processing mill. Texas-Zinc Minerals Corporation constructed the Mexican Hat mill on land leased from the Navajo Nation and operated the facility from 1957 to 1963. Atlas Corporation purchased the mill in 1963 and operated it until it closed in 1965. A sulfuric acid manufacturing plant operated at the site from 1957 to 1970. Control of the site reverted to the Navajo Nation after the lease expired in 1970.

Much of the ore brought to the mill contained a considerable amount of copper sulfide and other sulfide minerals and was processed to recover both copper and uranium. The milling process produced radioactive tailings, a predominantly sandy material. Spent tailings were mixed with process water and pumped through a pipeline to two onsite tailings piles.

The U.S. Department of Energy (DOE) completed surface remedial action at the site in 1995. Radioactive materials from the former upper tailings pile, demolished mill structures, and 11 vicinity properties were placed in a disposal cell constructed at the site of the former lower tailings pile. An additional 983,000 cubic yards of tailings and associated waste were hauled from the Monument Valley, Arizona, Processing Site about 15 miles to the south and placed in the cell on top of contaminated materials from the Mexican Hat site. A total of about 3.6 million cubic yards (4.4 million tons) of residual radioactive materials were stabilized in the Mexican Hat disposal cell.

Regulatory Setting

Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978 (Public Law 95-604), and DOE remediated 22 inactive uranium-ore-

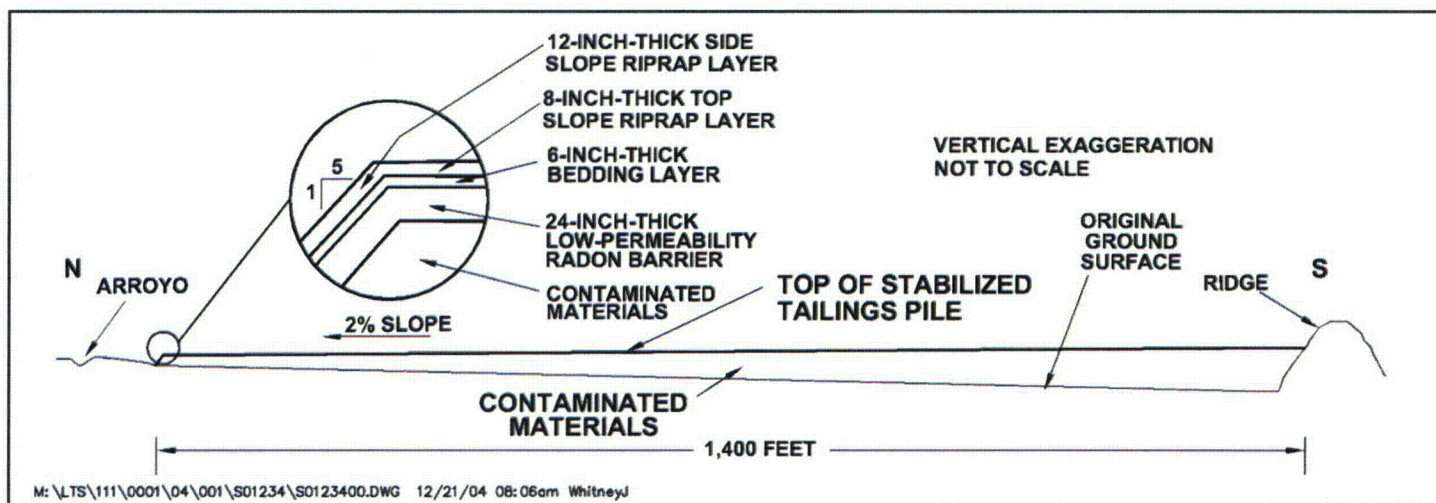


Location of the Mexican Hat, Utah, Disposal Cell

processing sites under the Uranium Mill Tailings Remedial Action Project in accordance with standards promulgated by the U.S. Environmental Protection Agency in Title 40 Code of Federal Regulations (CFR) Part 192. Subpart B of 40 CFR 192 regulated cleanup of contaminated groundwater at the processing sites. The U.S. Nuclear Regulatory Commission general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Mexican Hat disposal site was included under the general license in 1997.

Disposal Site Description

The Mexican Hat disposal site lies on a relatively flat mesa at an elevation of about 4,300 feet. The San Juan River is approximately 1 mile to the north and receives surface drainage from the site and surrounding area. Bounding the relatively flat mesa



North-South Cross Section of the Mexican Hat Disposal Cell

to the north and east are the ephemeral drainages North Arroyo and Gypsum Creek.

Average annual precipitation is 6 inches and is fairly evenly distributed throughout the year. The area is sparsely vegetated by desert shrubs and grasses, and the land around the site is used for limited residential purposes and livestock grazing.

The Permian Halgaito Formation is the geologic unit exposed at the site. Soil is thin to nonexistent in the area because of the extremely dry climate. Siltstone is the predominant rock type in the Halgaito; shale, fine-grained sandstone, and limestone lenses are also present but less common. The Halgaito is 80 to 215 feet thick in the site area and is divided into upper and lower units. Most of the upper unit is unsaturated but has some scattered groundwater in fractures and as perched water overlying finer-grained zones. The lower unit is classified as the uppermost aquifer at the Mexican Hat site. Groundwater in the lower unit is under artesian pressure and is isolated from groundwater in the upper unit by limestone beds that limit vertical water movement.

Although groundwater in the lower unit of the Halgaito has not been contaminated by past milling operations, the natural water quality near the site is likely unsuitable for human consumption. Groundwater samples collected from monitoring wells installed in the lower unit of the Halgaito showed the presence of hydrogen sulfide gas and naturally occurring petroleum.

Compliance Strategy

The groundwater compliance strategy for the Mexican Hat site is no remediation. Groundwater in the uppermost aquifer (the lower unit of the Halgaito Formation) has not been contaminated by uranium-milling activities. Although site-related contamination has been detected in groundwater

of the upper unit of the Halgaito, the occurrence of groundwater is sporadic and ephemeral. Site-related contamination is not expected to produce any adverse effects to human health or the environment.

In accordance with the Long-Term Surveillance Plan, DOE performed water quality monitoring at six seeps as a best management practice to evaluate disposal cell performance. During the 8 years of monitoring, seep flows were often too limited for obtaining samples; seep flows were expected to diminish following disposal cell construction. Although water quality monitoring results appeared to suggest site-related contamination was present in the seeps downgradient of the site, risk assessments concluded that no significant human or ecological risks are associated with the seeps at these minimal flows. Therefore, water quality monitoring of the seeps was discontinued in 2006. Visual observation, along with photographic documentation, of seep flows continues as part of the annual inspection of the site. Water quality monitoring will resume if seep flows increase as compared to historical observations.

Disposal Cell Design

The cell occupies an area of 68 acres on the 119-acre site. It abuts a rock outcrop on the south and rises 50 feet above the surrounding land on the other sides. A posted barbed-wire perimeter fence surrounds the cell. Residual radioactive materials in the cell were compacted before being covered. The cover of the disposal cell is a multicomponent system designed to encapsulate and protect the contaminated materials. The cover comprises (1) a low-permeability radon barrier (first layer placed over compacted tailings), (2) a bedding layer of sand and gravel placed as a capillary break, and (3) a rock (riprap) erosion protection layer. The cell design promotes rapid runoff of precipitation to minimize leachate. The cell cover was constructed with a 2 percent grade sloping to the north and east. Runoff water flows down the 20 percent side slopes into the

surrounding rock apron and exits the cell via three toe drains to arroyos north and east of the cell.

The site location and design were selected to minimize the potential for erosion from onsite runoff or storm water flow. All surrounding remediated areas were regraded and reseeded with native species. Existing gullies in the vicinity of the cell were armored with riprap that was keyed into competent rock to control erosion. Riprap-protected diversion ditches were installed to channel surface runoff water away from the cell.

Legacy Management Activities

DOE's Office of Legacy Management (LM) manages the disposal site according to a site-specific Long-Term Surveillance Plan to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site to evaluate the condition of surface features, performs site maintenance as necessary, and observes groundwater seeps to verify the continued integrity of the disposal cell.

In accordance with 40 CFR 192.32, the disposal cell is designed to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. However, the general license has no expiration date, and LM's responsibility for the safety and integrity of the Mexican Hat disposal cell will last indefinitely.

Contacts

Documents related to the Mexican Hat disposal site are available on the LM website at

http://www.lm.doe.gov/mexican_hat/Sites.aspx.

For more information about LM activities at the Mexican Hat site, contact

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way, Grand Junction, CO 81503

(970) 248-6070 (monitored continuously), or
(877) 695-5322 (toll-free)

12.0 Mexican Hat, Utah, Disposal Site

12.1 Compliance Summary

The Mexican Hat, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on April 5, 2011. The disposal cell and all associated surface water diversion and drainage structures were in good condition and functioning as designed. Runoff from storm events continues to transport sediment into the west diversion channel, resulting in low-density vegetation growth within the entire length of the channel; however, the performance of the diversion channel has not been impaired. New bullet holes in several perimeter signs indicate that vandalism continues at the site.

In accordance with approved recommendations presented in the seep monitoring evaluation report (*Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* [DOE-LM/GJ1139-2006, U.S. Department of Energy (DOE), March 2006]), annual observation of six designated seeps (0248, 0249, 0251, 0254, 0264, and 0922) was conducted during the inspection. No significant change from the previous year was noted; one of the seeps was dripping, and the other five were dry.

12.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Mexican Hat Disposal Site are specified in the *Long-Term Surveillance Plan for the Mexican Hat, Utah (UMTRCA Title I) Disposal Site, San Juan County, Utah* (DOE-LM/1530-2007, October 2007; LTSP) and in procedures established by DOE to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). Table 12-1 lists these requirements.

Table 12-1. License Requirements for the Mexican Hat Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 3.3 and 3.4	Section 12.3.1
Follow-Up or Contingency Inspections	Section 3.5	Section 12.3.2
Routine Maintenance and Repairs	Section 3.6	Section 12.3.3
Groundwater Monitoring	Section 3.7	Section 12.3.4
Corrective Action	Section 3.6	Section 12.3.6

Institutional Controls—The U.S. Bureau of Indian Affairs holds the 119-acre site in trust. The Navajo Nation retains title to the land. DOE and the Navajo Nation executed a Custodial Access Agreement that conveys to the federal government title to the residual radioactive materials stabilized at the site and ensures that DOE has perpetual access to the site. UMTRCA authorized DOE to enter into Cooperative Agreement DE-FC04-85AL26731 with the Navajo Nation, and the U.S. Nuclear Regulatory Commission (NRC) required it prior to bringing the site under the general license. The purpose of the Cooperative Agreement was to facilitate remedial actions at the former processing site. The site was accepted under the NRC general license (10 CFR 40.27) in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the site, as defined by DOE Policy 454.1, consist of federal control of the property, a site perimeter

fence, warning/no-trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection. Inspectors found no evidence that these institutional controls were ineffective or violated.

12.3 Compliance Review

12.3.1 Annual Inspection and Report

The site, south of Mexican Hat, Utah, was inspected on April 5, 2011. The results of the inspection are described below. Figure 12–1 shows features and photograph locations (PLs) mentioned in this report. Numbers in the left margin of this report refer to items summarized in the “Executive Summary” table.

12.3.1.1 Specific Site-Surveillance Features

Access, Fence, Gate, and Signs—The site is accessed via a short, unmarked dirt road off U.S. Highway 163, approximately 1 mile south of the San Juan River. The dirt road heads east and ends at a graded parking area. The access road crosses Navajo Nation land, and access is granted under the Custodial Access Agreement. Erosion continues to occur along the dirt road, but the site is still accessible; no repairs are necessary at this time. Trash, including substantial quantities of broken glass, accumulates along the entrance road and in the parking area.

A barbed-wire perimeter fence is located between the disposal cell features and the site boundary. Other than erosion of soil down to rock at a couple of locations near the south and southwest diversion channel, the perimeter fence is in excellent condition. Periodically, the fence is damaged by livestock or erosion and requires repair. Erosion has increased the spacing between the lowest strand and the ground surface between perimeter signs P37 and P40. An additional strand of non-barbed (wildlife-friendly) wire was added in 2010 (PL–1). Erosion continues to migrate up to the end of the west diversion channel at perimeter signs P42 and P43 but is not a concern at this time.

The entrance sign located at the gate is in excellent condition. There are 43 perimeter sign locations, and each location has a pair of signs: an upper property ownership sign and a lower radioactive materials disposal site warning sign. The perimeter signs were present and legible although several are bent or damaged by bullet holes. Several signs on the south boundary, including the replaced perimeter sign P23, which was moved inside the perimeter fence, have new bullet holes after being replaced in October 2010.

Site Markers and Monuments—The 2 site markers, 4 survey monuments, and 12 boundary monuments were inspected. All were in good condition. Boundary monument BM–11 is in an area subject to erosion but remains stable.

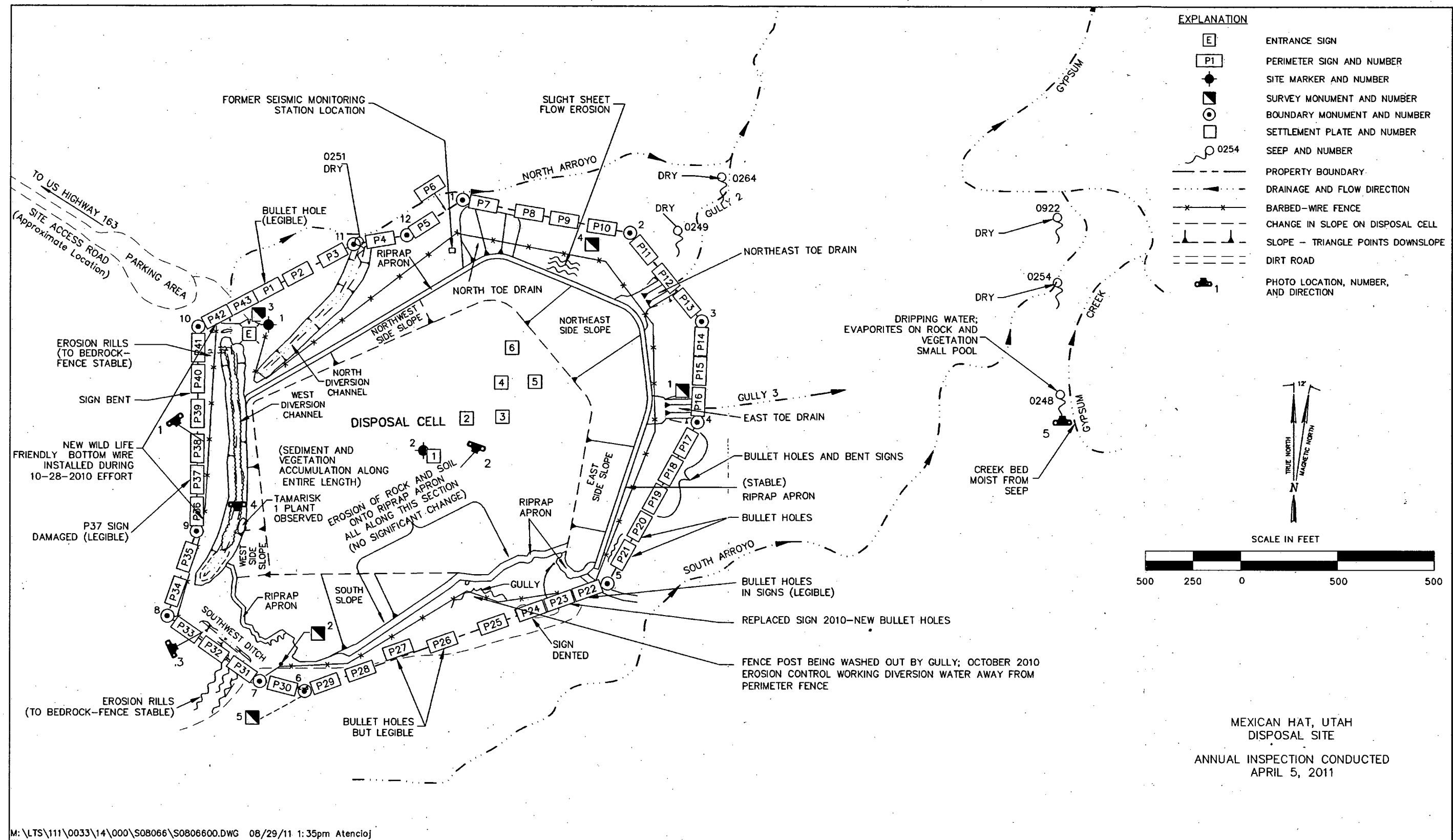


Figure 12-1. 2011 Annual Compliance Drawing for the Mexican Hat Disposal Site

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Settlement Plates—There are six settlement plates on top of the disposal cell. All were secure and in good condition. No evidence of settlement on the disposal cell cover was observed. The settlement plates were surveyed for several years following cell construction, but the surveying is no longer required.

Monitoring Wells—In 2007, the four remaining monitoring wells (0899, 0934, 0935, and 0909) at the site were decommissioned following the Navajo Nation concurrence that groundwater monitoring is not required to maintain protectiveness.

12.3.1.2 Transects

To ensure a thorough and efficient inspection, inspectors divided the site into four areas called “transects”: (1) the riprap-covered disposal cell top slope, (2) the riprap-covered side slopes and diversion ditches, (3) the area between the disposal cell and the site boundary, and (4) the outlying area.

Within each transect, inspectors examined specific site-surveillance features, such as the entrance gate and sign, survey and boundary monuments, perimeter signs and fences, and site markers. Inspectors examined each transect for evidence of erosion, settling, slumping, and other disturbances that might harm the site’s integrity or long-term performance.

Top of the Disposal Cell—The top of the disposal cell was in excellent condition. There was no evidence of differential settling, cracking, erosion, or burrowing. All visible components of the disposal cell and cover were functioning as designed. No vegetation was observed to be growing on top of the disposal cell (PL-2).

Side Slopes, Toe Drains, Aprons, and Diversion Channels—The disposal cell side slopes, toe drains, aprons, and diversion channels were in excellent condition and functioning as designed (PL-3).

The sloughing of red country rock and soil along the south apron does not appear to have increased significantly during the past year. Because the apron in this area is immediately adjacent to the steep rocky cliff face along the southern edge of the disposal cell cover, it is anticipated that a certain amount of sediment and unstable rock from the cliff face will, over time, continue to fall onto the apron. This area has been inspected for several years, with little or no change being observed from year to year. As a best management practice, inspectors will continue to monitor this area; however, this fallen material is not expected to impact the performance of the disposal cell.

Areas off site and upgradient continue to erode and transport sediment onto the site and into the west diversion channel. The sediment accumulation has promoted the growth of vegetation in the channel, including perennial grasses and annual weeds; however, the sediment and vegetation are not affecting the performance of these drainage structures.

A tamarisk plant was observed on the site during the inspection in the west diversion channel outside of the cap (PL-3). Its growth will be monitored, and it may be removed during the next scheduled maintenance effort. Though present in arroyos outside the site, tamarisk will continue to be controlled on the site.

Area Between the Disposal Cell and the Site Boundary—Erosional rills and gullies continue forming along the western edge of the site boundary, primarily upgradient of, and between, boundary monuments BM-7 and BM-8. This is an expected natural process and a result of the site's stabilizing and coming to equilibrium with the outlying areas. Erosion in these areas will continue to be monitored, but it is not a concern unless it damages the perimeter fence or impacts the performance of the west diversion channel.

Scattered trash (broken glass, bottles, cans, cardboard, and paper containers) is accumulating in the more accessible portions of the site where vehicular access is available. The most noticeable accumulations of trash were along the entrance road and in the parking area, along the perimeter fence between perimeter signs P31 and P42, and in the southern portion of the site between perimeter signs P22 and P27. Periodic removal of trash may be required to maintain the integrity of the perimeter fence and to keep the trash from entering the fenced area.

Tumbleweeds as well as trash continue to accumulate along the west and southwest sections of the perimeter fence, primarily between perimeter signs P31 and P42. However, the accumulation does not appear to be impacting the fence.

Trespassing just inside the site property boundary (outside the perimeter fence) occurs in the same areas where trash accumulations are noted, as evidenced by vehicle (e.g., all-terrain vehicle [ATV]) tracks. Vandalism has increased, as indicated by new bullet holes in several perimeter signs. This is anticipated to be an ongoing problem at the site.

Outlying Area—The area surrounding the site was visually inspected for signs of erosion, development, or other disturbances that might affect site integrity or security. As discussed above, trash continues to accumulate primarily in areas immediately adjacent to the site property boundary. The area within 0.25 mile of the site boundary appears to be popular with ATV and four-wheel-driving enthusiasts. No other changes were observed that would impact the integrity of the site.

12.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2011.

12.3.3 Routine Maintenance and Repairs

A new sign will be installed during the next inspection at seep location 254.

12.3.4 Groundwater Monitoring

An effective aquitard and an upward hydraulic gradient prevent any overlying water from migrating downward into the uppermost aquifer. Therefore, contamination from either the disposal cell or the former uranium-processing-site activities has not impacted groundwater in

the uppermost aquifer, and the LTSP does not require that groundwater in the uppermost aquifer be monitored.

However, due to concerns raised by the Navajo Nation, groundwater was monitored at the site from November 2000 to August 2002, as a best management practice. This monitoring was performed to demonstrate that no site-related contamination had entered the uppermost aquifer and that the upward hydraulic gradient was present. The groundwater monitoring results from this 2-year period confirmed these conditions, and the results were presented in the report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site*. This report was submitted to the Navajo Nation in March 2006. In July 2006, the Navajo Nation concurred that continued groundwater monitoring of the uppermost aquifer at the site was not necessary. As a result, DOE decommissioned the remaining four monitoring wells at the site in April 2007.

12.3.5 Seep Monitoring

12A From 1998 through 2005, in accordance with the LTSP, and when sufficient flows have allowed, seep water quality monitoring was performed as a best management practice due to concerns raised by the Navajo Nation over cell performance and historical processing-site-related contamination. In 2006, an evaluation of the Seep-Monitoring Program was conducted and presented in the report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site*. Based on the monitoring results, the hydrogeological conditions at the site, the continued low flows from the seeps, and the absence of any receptors, a recommendation was made to discontinue water quality monitoring of the seeps in lieu of annual observation of seep flow rates during site inspections. The recommendation stated that if a significant increase in seep flows was observed, an evaluation would be performed to determine if water quality monitoring should resume. In July 2006, the Navajo Nation conditionally concurred on these recommendations. The report was submitted to NRC in August 2006.

The site LTSP was revised and submitted to NRC in October 2007 to reflect the Navajo Nation's concurrence on discontinuing water quality monitoring of the seeps in lieu of continuing annual observations of seep flows, and to present the results of the best-management-practice groundwater monitoring performed, as discussed previously. The revised LTSP states that the annual observation of seep flows will continue for a minimum of 10 years, at which time an evaluation will be performed to determine the need to continue seep-flow monitoring. The revised LTSP states that if the seep flows significantly increase, the need to resume water quality monitoring would be reevaluated.

In accordance with the revised LTSP, visual monitoring of seep flows was conducted during the 2011 annual inspection. The flows of six seeps were observed and documented to be negligible or nonexistent. The seeps are primarily the result of perched water that leaked from the former-processing-site tailings pond for many years. To a lesser degree, they are also the result of transient drainage from the wet tailings placed in the disposal cell. Seep flows are expected to diminish over time; however, a minor amount of recharge does occur, as evidenced by the presence of seeps upgradient of the former processing site and disposal cell. Historical documentation and records also indicate the presence of seeps prior to former-processing-site operations. Warning signs advising the public to not drink the water remain posted at the seep locations.

The flow and small pool observed in seep 0248, located in Gypsum Creek and cross-gradient from the disposal cell, were similar to those observed during previous years (PL-4). The remaining five seeps were dry.

Table 12-2. Description of Seep Flows at the Mexican Hat Disposal Site

Seep Location Number	Drainage	Hydrological Relationship to Disposal Cell	Observations and Descriptions of Seep Flow (Qualitative)
0248	Gypsum Creek	Downgradient	Minimal flow and dripping from adjacent rock face; no flow from the pool or the immediate area. Soils moist in immediate area surrounding the seep.
0249	Gully 2	Downgradient	Dry; no evidence of a seep (i.e., no moist soils or riparian vegetation were present).
0251	North Arroyo	Downgradient	Dry; no observed flow. Minimal vegetation, primarily tamarisk (very little other riparian vegetation).
0254	South Arroyo	Downgradient	Dry; no flow or moist soil present where standing pool of water usually exists from recent rain events. Very little riparian vegetation besides tamarisk. Location not posted.
0264	North Arroyo	Downgradient	Dry; no flow.
0922	South Arroyo	Downgradient	Dry; no change from previous year's inspection.

12.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2011.

12.3.7 Photographs

Table 12-3. Photographs Taken at the Mexican Hat Disposal Site

Photograph Location Number	Azimuth	Description
PL-1	145	New fence strand added to the bottom of the fence in October 2010.
PL-2	200	Top of disposal cell.
PL-3	65	Inspectors along the northwest side of the disposal cell.
PL-4	180	Tamarisk in west diversion channel.
PL-5	0	Seep 0248 dripping with small pool.



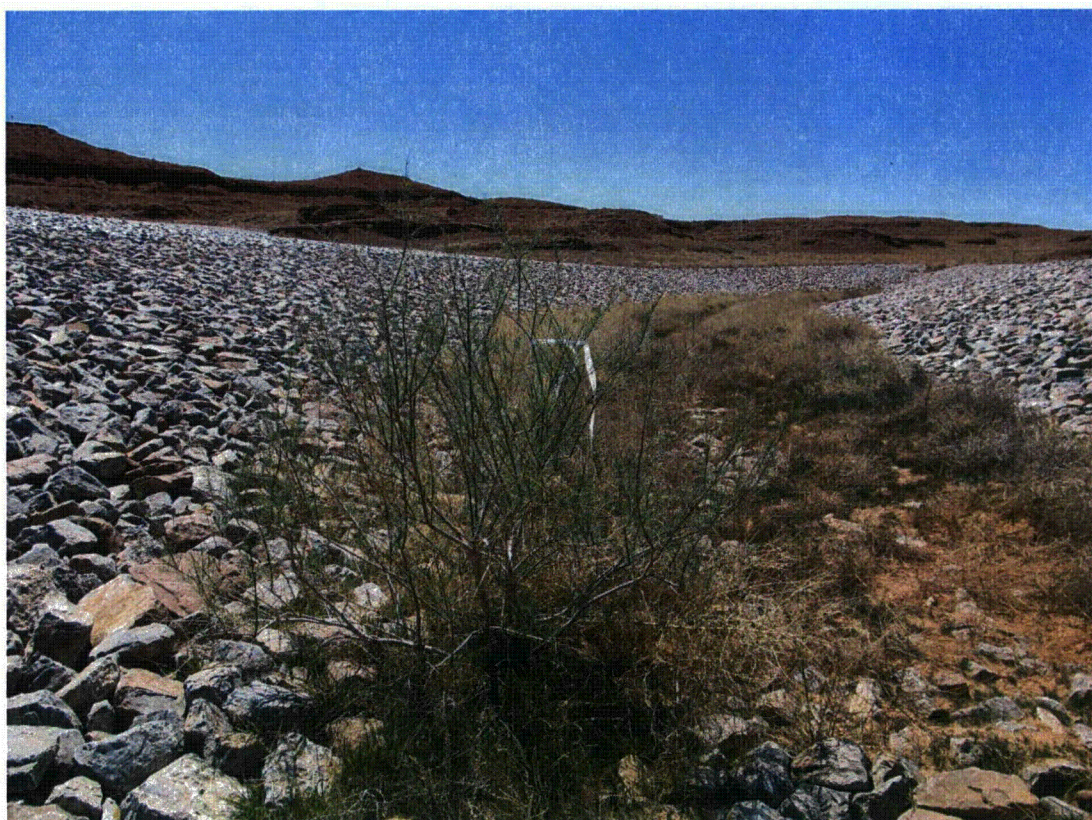
HAT 4/2011. PL-1. New fence strand added to the bottom of the fence in October 2010.



HAT 4/2011. PL-2. Top of disposal cell.



HAT 4/2011. PL-3. Inspectors along the northwest side of the disposal cell.



HAT 4/2011. PL-4. Tamarisk in west diversion channel.



HAT 4/2011. PL-5. Seep 0248 dripping with small pool.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

May 11, 2012

MEMORANDUM TO: DOCKET FILE WM-00063

THROUGH: D. Blair Spitzberg, PhD, Chief /RA/
Repository and Spent Fuel Safety Branch

FROM: Robert J. Evans, CHP, PE, Senior Health Physicist
Linda M. Gersey, Health Physicist
Repository and Spent Fuel Safety Branch

SUBJECT: MEXICAN HAT DISPOSAL SITE
OBSERVATIONAL SITE VISIT

On April 3, 2012, NRC Region IV staff conducted an observational site visit at the U.S. Department of Energy's (DOE) Mexican Hat Title I disposal site located at Mexican Hat, Utah. This site visit was conducted using guidance approved April 17, 2012 (ML120930240). The purpose of the site visit was to observe DOE's routine, annual visit to the facility. Attached is the NRC's observational trip report for this site visit.

In summary, the DOE representatives conducted the annual inspection in accordance with the Long-Term Surveillance Plan for the Mexican Hat, Utah (UMTRCA Title I) Disposal Site dated October 2007. No regulatory issues or safety concerns were identified during the site visit.

Docket: WM-00063

Attachment:
NRC Trip Report

cc with attachment:
Richard P. Bush, Site Manager
DOE Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

bcc with enclosure:

Anton Vogel, D:DNMS

Vivian Campbell, DD:DNMS

Blair Spitzberg, C:RSFS

Robert Evans, RSFS

Linda Gersey, RSFS

Lydia Chang, FSME/DWMEP/DURLD

Dominick Orlando, FSME/DWMEP/DURLD

Paul Michalak, FSME/DWMEP/DURLD

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Final: R:_DNMS\2012\ Mexican Hat Site Visit 2012.docx

ADAMS: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> SUNSI Review Complete	Reviewer Initials: RJE
	<input checked="" type="checkbox"/> Publicly Available	<input checked="" type="checkbox"/> Non-Sensitive
	<input type="checkbox"/> Non-publicly Available	<input type="checkbox"/> Sensitive
RIV:DNMS/RSFS	RSFS	C:RSFS
RJEvans	LMGersey	DBSpitzberg
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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: WM-00063

Report: WM-00063/12-001

Licensee: U.S. Department of Energy

Facility: Mexican Hat Disposal Site

Location: Mexican Hat, Utah

Date: April 3, 2012

Inspectors: Robert J. Evans, CHP, PE, Senior Health Physicist
Linda M. Gersey, Health Physicist
Repository and Spent Fuel Safety Branch

Accompanied by: D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch

Approved by: D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch

NRC Trip Report

1. Background

The Mexican Hat disposal site is located on the Navajo Nation reservation near Mexican Hat, Utah. Pursuant to the Uranium Mill Tailings Radiation Control Act (UMTRCA), the U.S. Department of Energy (DOE) maintains control of this Title I site under a trust agreement. The DOE completed the remediation of the Mexican Hat disposal site during 1995, and the NRC accepted the site under the NRC general license (10 CFR 40.27) during 1997. The disposal cell contains approximately 4.4 million tons of residual radioactive wastes including mill tailings. The disposal cell covers approximately 68 acres of the 119-acre site.

Groundwater in the uppermost aquifer was not contaminated by previous uranium milling operations. However, the groundwater in the soils located between the uppermost aquifer and the surface was impacted by previous operations. As a result, DOE continues to monitor selected seeps on an annual basis. The DOE committed to monitor seeps until at least 2016. At that time, DOE will reassess the need for continued monitoring of the seeps.

The last annual DOE inspection was conducted on April 5, 2011. During that inspection, no significant changes were noted from the previous year's inspection. Further, no problems were identified that required immediate contingency action.

2. Site Status

The site consists of a disposal cell located within a fenced boundary. Two former mill structures and sewage lagoons remain on site property, but outside of the fenced area. The disposal cell was constructed with a rip-rap layer, bedding layer, and radon barrier over the contaminated materials. DOE installed 43 warning signs and 12 boundary markers around the disposal cell. DOE also installed two site markers on the site property. One marker was installed on top of the cell and the second marker was installed adjacent to the main gate.

Regulation 10 CFR 40.27(c) states that the DOE shall implement the long-term surveillance plan (LTSP), and care for the disposal site in accordance with the provisions of the LTSP. The most recent LTSP for the Mexican Hat site was submitted to the NRC by DOE letter dated October 22, 2007. This LTSP included changes to the seep sampling program that were previously approved by the NRC by letter dated February 20, 2007. The DOE used this version of the LTSP during its annual inspection.

3. Site Observations and Findings

To conduct the annual inspection, the DOE created an inspection checklist. The checklist included requirements to inspect the fences, boundary monuments, site markers, perimeter signs, and entrance gate. Also, the DOE inspectors were required to check the condition of the disposal cell top, side slopes, diversion ditches, the area between the cell and the site boundary, and the outlying areas. Further, the DOE inspectors were required to observe the status of vegetation. For this site only, the DOE inspectors were required to monitor six seeps.

During the inspection, DOE observed that the site fences were adequately intact, all markers and monuments were in place (although one boundary monument was initially hard to find), the entrance gate was intact, but a number of boundary signs had been vandalized by gunfire. The disposal cell appeared to be in excellent condition. The erosion barrier was in place, and no settlement was observed. Some vegetation was identified in the western diversion channel. However, the DOE inspectors reasonably assessed that the vegetation was not a significant concern because it was not impacting the disposal cell itself. Selected seeps were found to be moist but none contained enough fluid for sampling.

The NRC inspectors noted that the arroyo near the main gate, located on the northwestern side of the disposal cell, was eroding towards the western diversion channel. The NRC staff discussed with the DOE representatives the possible need for intervention at some point in the future. The DOE representatives acknowledged that repairs may be necessary in the future to slow down the erosion. However, the NRC staff concluded that the erosion did not require immediate action, and the erosion did not appear to have a future impact on the disposal cell itself.

The DOE representatives determined that minor fence repairs and sign replacements were necessary at some future date. Some minor erosion was identified around the disposal cell, but not on the cell itself. A similar level of erosion was also identified during last year's inspection, suggesting that the rate of erosion was slow. The DOE representatives did not identify any significant problems during the annual inspection that required immediate contingency actions.

The NRC inspectors measured the ambient gamma exposure rates using hand-held survey meters (Ludlum Model 19 survey meters, NRC Nos. 015525 and 015540, calibration due dates of 04/27/12 and 04/27/12, respectively). With a background of about 8-10 microRoentgens per hour ($\mu\text{R/hr}$), most measurements ranged from background to about 13 $\mu\text{R/hr}$. One discrete location on the southeastern side of the site measured up to 16 $\mu\text{R/hr}$. Overall, the survey results indicate that the site property was consistent with background levels.

4. Conclusions

The NRC inspectors concluded that the DOE inspectors conducted the site inspection in accordance with LTSP and 10 CFR 40.27 requirements. The condition of the site was nearly identical to the condition that was reported during the previous year's DOE inspection, as documented in the 2011 annual report. The NRC inspectors discussed the erosion of one arroyo with DOE representatives, but this erosion was not affecting the disposal cell. However, DOE may have to address this erosion at some point in the future because it may eventually impact a site diversion channel.

5. Meeting Summary

The NRC staff conducted a pre-planning meeting with the DOE representatives the day before the site inspection. During this meeting, the NRC and DOE staff discussed topics such as site status, inspection plan, and potential hazards.

6. Persons Contacted

L. Benally, Jr., Navajo AML Reclamation
R. Bush, Site Manager, DOE Office of Legacy Management
J. Gillespie, Site Lead/Geologist, S.M. Stoller Corporation
R. Johnson, Site Lead/Geologist, S.M. Stoller Corporation

Figure 1: Arroyo erosion that is approaching the west diversion channel



Figure 2: Site Marker No. 1

